

Pump Module

User Guide

Original Instructions



Agilent Technologies

Notices

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Pump Module User Guide

This guide describes the Agilent Pump Module, which fills and empties Agilent autofilling reservoirs.

This guide contains the following topics:

- “Safety and regulatory compliance” on page 2
- “Laboratory setup requirements” on page 5
- “Pump Module overview and components” on page 6
- “Setup workflow” on page 8
- “Autofilling reservoir options” on page 9
- “Connecting the Pump Module” on page 12
- “Installing a Weigh Station” on page 20
- “Maintenance and troubleshooting” on page 22

For instructions on how to configure the autofilling parameters and how to use the Pump Module in a protocol, see the user documentation for your automation software and liquid-handling device. You can search the product knowledge base or download the latest version of a PDF file from the Agilent Technologies website at:

www.agilent.com/lifesciences/automation



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The Pump Module is not intended or approved for diagnosis of disease in humans or animals. You assume full responsibility for obtaining any regulatory approvals required for such use and assume all liability in connection therewith.

Safety labels and warnings

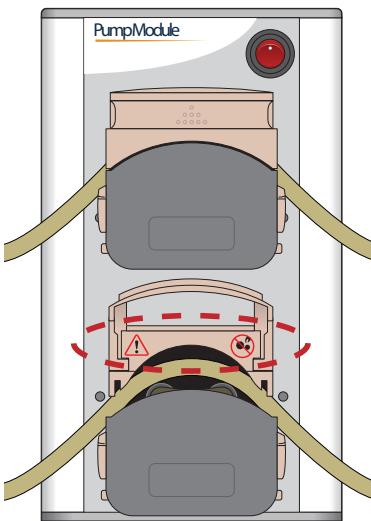
Warnings in the user documentation or on the device must be observed during all phases of operation, service, and repair of this device. Failure to comply with these precautions violates safety standards of design and the intended use of the product. Agilent Technologies assumes no liability for the customer's failure to comply with these requirements.

The following table lists the common symbols you might find on the device. The symbol on the label indicates the risk of danger. A description of the warning and information that will help you avoid the safety hazard are provided in this guide.

Symbol	Description
	Indicates that you must read the accompanying instructions (for example, the safety guide) for more information before proceeding.
	Indicates hazardous voltages.
or	Indicates pinch, crush, and cut hazard.
	Indicates protective conductor terminal, which is bonded to conductive parts of an equipment for safety purposes.
	Indicates that you must not discard this electrical/electronic product in domestic household waste.

The following figure shows symbols that are located underneath each pump head cover.

Figure Safety symbols under the opened pump head cover



WARNING Pinch hazard! Do not allow fingers to contact moving parts.



WARNING Ensure that the Pump Module is turned off before lifting the flip-top cover on a pump head. Keep the covers closed while the pumps are running.



WARNING Do not remove the exterior Pump Module covers or otherwise disassemble the device. Doing so can expose you to hazardous-voltage electronics and damage the Pump Module.



WARNING Ensure that protective clothing and eye protection are worn if hazardous products are being pumped.



WARNING Ensure that liquid does not contact the device electronics. Periodically inspect the tubing for leaks.

CAUTION Do not lift the Pump Module by the peristaltic pumps that are mounted on the front of the device. Doing so could damage the Pump Module.

Compliance standards

The Pump Module complies with the applicable EU Directives and bears the CE mark. See the Declaration of Conformity for details. The Pump Module is designed to comply with the standards listed in the following table.

Regulatory Compliance	Standard
EMC	
European Union	EMC Directive 2004/108/EC IEC 61326- 1:2005 / EN 61326- 1:2006
Canada	ICES/NMB-001:2004
Australia/New Zealand	AS/NZS CISPR 11:2004
Safety	
European Union	Machinery Directive 2006/42/EC Low Voltage Directive 2006/95/EC IEC 61010- 1:2001 / EN61010- 1:2001
Canada	CAN/CSA- C22.2 No. 61010- 1- 04
USA	ANSI/UL 61010- 1:2004

Electromagnetic compatibility

If the Pump Module causes interference with radio or television reception, which can be determined by turning the device off and on, try one or more of the following measures:

- Relocate the radio or television antenna.
- Move the device away from the radio or television.
- Plug the device into a different electrical outlet, so that the device and the radio or television are on separate electrical circuits.
- Make sure that all peripheral devices are also certified.
- Make sure that appropriate cables are used to connect the device to peripheral equipment.
- Consult your equipment dealer, Agilent Technologies, or an experienced technician for assistance.

Changes or modifications not expressly approved by Agilent Technologies could void the user's authority to operate the equipment.

Sound emission declaration

Sound pressure: Lp < 70 dB according to EN 27779:1991.

Schalldruckpegel: LP < 70 dB nach EN 27779:1991.

Laboratory setup requirements

Placement considerations

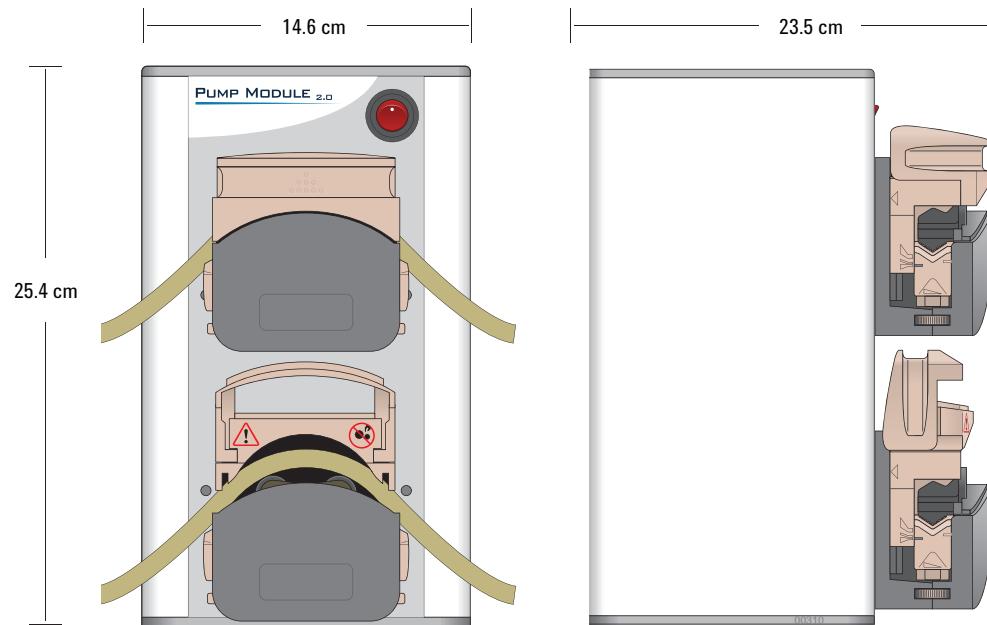
The Pump Module must be located near a power source to connect the power cord, and near the controlling liquid-handling device to connect the communication cable. If applicable, the Pump Module must be positioned to enable connecting the cable from the Agilent Weigh Station, Weigh Pad, or Weigh Shelf.

IMPORTANT Make sure the Pump Module is located away from heat and air conditioning ducts and away from direct sunlight, as these conditions could interfere with the Pump Module performance.

Specifications

The following figure shows the Pump Module dimensions.

Figure Pump Module dimensions (front and side view)



The dimensions and additional site requirements are as follows.

Specification	Value
Dimensions	
Height	25.4 cm (10.0 in)
Width	14.6 cm (5.75 in)
Depth	23.5 cm (9.25 in)
Electrical	100–240~, 50/60 Hz, 1.5 A

Specification	Value
Environmental	
Operating temperature	0–40 °C
Humidity condition	10–90% RH, non-condensing
Elevation	1–2000 m

Related information

For information about...	See...
Safety guidelines	"Safety and regulatory compliance" on page 2
Pump Module maintenance	"Maintenance and troubleshooting" on page 22

Pump Module overview and components

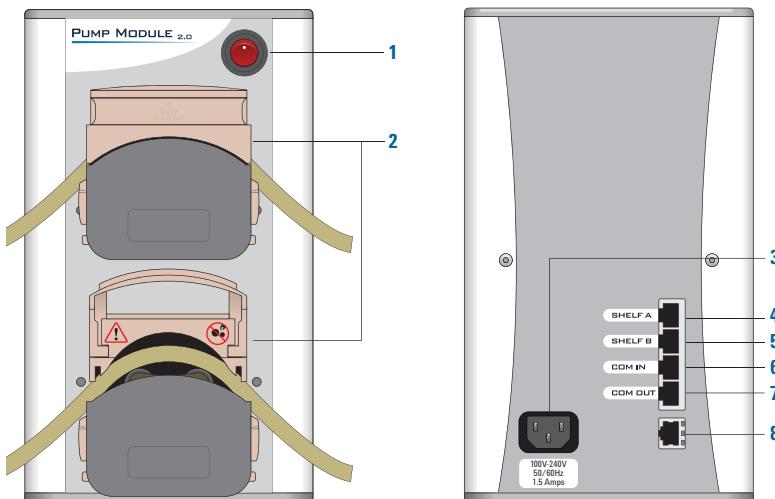
Overview

The Pump Module contains two peristaltic pumps, one that pumps the fresh source fluid into a reservoir, and a second one that pumps the waste fluid from the reservoir. Optionally, you can use the Pump Module with an Agilent Weigh Station, Weigh Shelf, or Weigh Pad to provide precise liquid-level control for an autofilling reservoir or wash station.

Components

The following figure shows the primary components and the table provides descriptions of each component.

Figure Pump Module front view (left) and rear view (right)



Item	Feature	Description
1	Power switch	Turns on or turns off the power.
2	Peristaltic pump	Pumps fluid in either a forward or reverse direction, as specified in the automation control software. Each pump has a flip-top cover that enables you to route the tubing.
3	AC power connector	Connects the power cable.
4	SHELF A port	Connects the communication cable from a Weigh Shelf, Weigh Station, or Weigh Pad to the Pump Module.
5	SHELF B port	Connects the communication cable from a second Weigh Shelf, Weigh Station, or Weigh Pad.
IMPORTANT Agilent Technologies recommends one Pump Module for each pairing of reservoir and Weigh Shelf, Weigh Station, or Weigh Pad.		
6	COM IN port	Connects the communication cable from a Pump Module to the controlling liquid-handling device to enable communication.
7	COM OUT port	Connects the communication cable from one Pump Module to another Pump Module in a series. Up to eight Pump Modules can be connected and controlled through one liquid-handling device. For details, see “ Connecting power and communication ” on page 12
8	Port	Not used

IMPORTANT The ports described in items 4-7 are not Ethernet ports.

Related information

For information about...	See...
Pump Module specifications	"Laboratory setup requirements" on page 5
Pump Module maintenance	"Maintenance and troubleshooting" on page 22

Setup workflow

About this topic

This topic describes the workflow for setting up an autofilling station or shelf on a liquid-handling device using the Pump Module.

Autofilling station or shelf setup workflow

Step	Procedure	See...
1	Ensure that you are familiar with the input and output ports for the type of autofilling reservoir you are using.	"Autofilling reservoir options" on page 9
2	If applicable, install the Weigh Station or Weigh Shelf. <i>Note:</i> Agilent Technologies installs the Weigh Pad, if applicable.	<ul style="list-style-type: none">• <i>Weigh Station.</i> See "Installing a Weigh Station" on page 20• <i>Weigh Shelf.</i> See the <i>Vertical Pipetting Station User Guide</i>.
3	Connect the Pump Module cables and route the tubing.	"Connecting the Pump Module" on page 12
4	In the automation software, configure the Pump Module, reservoir, and associated resources.	User documentation for the automation software at www.agilent.com/lifesciences/automation
5	<i>Weigh Station only.</i> Verify the teachpoint accuracy.	User documentation for the liquid-handling device at www.agilent.com/lifesciences/automation
6	Verify the autofilling function of the completed setup by performing a pump fill and empty task using the automation software.	User documentation for the automation software at www.agilent.com/lifesciences/automation

Autofilling reservoir options

About this topic

This topic describes the following containers that can be automatically filled and emptied using the Pump Module:

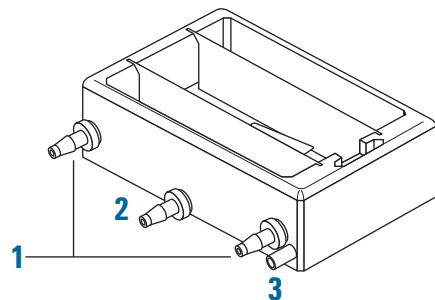
- Agilent Auto Filling Reservoir
- Agilent Tip Wash Station (also known as the MicroWash Reservoir)
- Agilent Open Wash Reservoir

Agilent reservoirs are approved for use with most reagents and solvents. If you have questions on the use of a particular chemical or solvent, contact Automation Solutions Technical Support before use.

Auto Filling Reservoir

The Auto Filling Reservoir is an open tray that can be installed on a Weigh Station for precision liquid-level control. The reservoir can supply reagents to single-channel pipettors and multichannel pipette heads.

Figure Auto Filling Reservoir

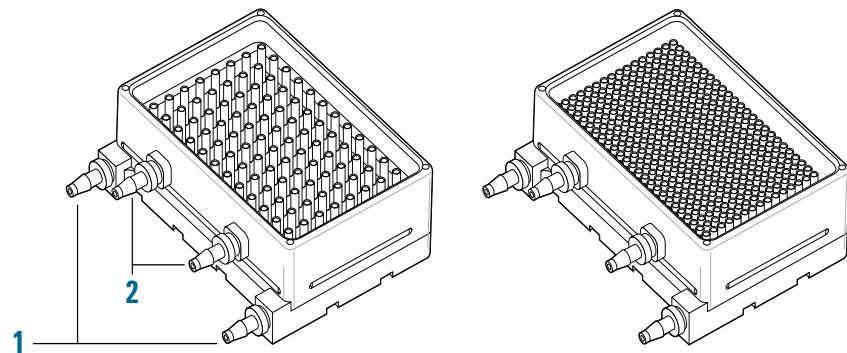


Item	Description
1	<i>Inlet ports.</i> Connect to the input tubing from the Pump Module that fills the reservoir.
2	<i>Outlet port.</i> Connects to the output tubing from the Pump Module that empties the reservoir.
3	<i>Overflow drain.</i> Uses gravity to drain excess fluid.

When properly configured in the automation software, the Pump Module automatically fills and drains the Auto Filling Reservoir. As the figure shows, two inlet ports are available to supply reagents to the reservoir. An outlet port is used to pump the waste and excess fluid from the reservoir. An overflow drain port can also be connected to drain the excess fluid.

Tip Wash Station

The Tip Wash Station is available in 96-chimney or 384-chimney formats.

Figure Tip Wash Station: 96-chimney (left) and 384-chimney (right)

Item	Description
1	<i>Inlet ports.</i> Fill the wash station. Liquid flows up through the chimneys.
2	<i>Outlet ports.</i> Empties the wash station. The overflow of the chimneys flows out through the two upper output ports.

You can use the 96- and 384-chimney Tip Wash Station with any of the Agilent 96-channel pipette heads. However, the 384-channel pipette head is limited to the 384-chimney Tip Wash Station.

CAUTION Attempting to use the 384-channel pipette head with a Tip Wash Station other than the 384-chimney format can damage the pipette head.

Make sure the pipette tips do not touch the bottom of the Tip Wash Station. To adjust the distance from the bottom, you can set parameters in the automation software. For instructions, see the user documentation for the device automation software.

CAUTION To prevent potential damage to the tips, ensure that the pipette tips do not touch the bottom of a reservoir.

The chimneys in the wash station prevent carryover and reduce contamination. The Pump Module pumps wash liquid into the Tip Wash Station through two inlet ports. The wash liquid flows up through the chimneys in the Tip Wash Station to wash the tips. The waste overflows from the chimneys and is removed through two outlet ports.

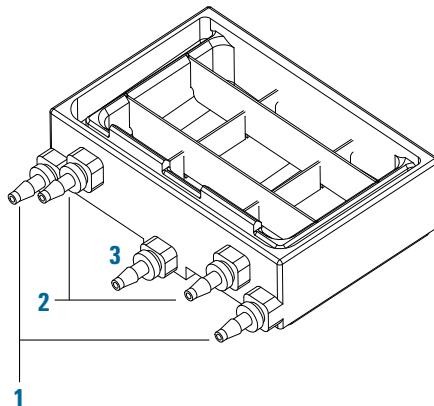
Optionally, the Tip Wash Station can be used on a Weigh Shelf for precision liquid-level control.

Open Wash Reservoir

The Open Wash Reservoir is an open tray that can be installed on a Weigh Shelf for precision liquid-level control.

CAUTION *Vertical Pipetting Station only.* Ensure that the baffles are installed in the reservoir to prevent potential splashing when the shelf moves.

Figure Open Wash Reservoir



To set up the tubing for each mode:

Item	Description	Overflow mode	Fill and empty mode
1	Inlet ports	Connected to input (fill) tubing	Connected to input (fill) tubing
2	Outlet ports	Connected to output (empty) tubing	Plugged
3	Bottom center port	Plugged	Connected to output (empty) tubing

When properly configured in the automation software, the Pump Module automatically fills and drains the reservoir. The Open Wash Reservoir can be set up to run in either of two modes:

- *Overflow mode.* Fresh wash solution enters the reservoir from the two inlet ports (1), overflows into the overflow trough, and is pumped through the two outlet ports (2) to waste.
- *Fill and empty mode.* Fresh wash solution enters the reservoir from the two inlet ports (1), but is drained via the bottom center port (3). In this mode the reservoir is filled and emptied one or more times between each wash cycle. The reservoir design ensures maximal emptying to reduce the contamination load in the wash fluid between each cycle.

Related information

For information about...	See...
Setup workflow	“Setup workflow” on page 8
Maintaining the Pump Module	“Maintenance and troubleshooting” on page 22

Connecting the Pump Module

About this topic

This topic describes how to connect the cables and route the tubing.

Connecting power and communication

Before you begin

- Ensure that the Pump Module location meets the site requirements.
- Make sure you have the Pump Module power cord and communications cable.



WARNING Ensure that the power cords are in good condition and are not frayed. Use of frayed or damaged power cords can cause injury.



WARNING Ensure that the Pump Module and the associated liquid-handling device, such as the Bravo Platform, are turned off before connecting the cables and routing the tubing.

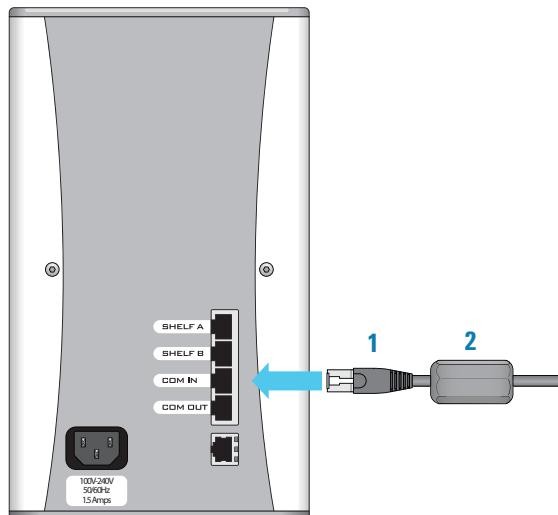
CAUTION Before operating the Pump Module, ensure that the communications cable plug with the EMI filter is connected to the COM IN port. Failure to do so will cause the Pump Module to be non-compliant with the EU Directives for electromagnetic emissions and may cause interference with nearby instruments.

Connecting the cables

To connect the power and communication cables:

- 1 Ensure that the liquid-handling device and the Pump Module are turned off.
- 2 Connect the end of the communications cable with the EMI filter to the Pump Module COM IN port, and connect the other end of the cable to the pump I/O port on the liquid-handling device.

Figure Pump Module communications cable (1) with EMI filter (2)



- 3 To connect multiple Pump Modules, use a second serial cable to connect the COM OUT port on the first Pump Module to the COM IN port on the second Pump Module.

CAUTION Ensure that the communications cable plug with the EMI filter is connected to the Pump Module COM IN port.

Repeat this step for each Pump Module that is to be controlled by the same device. Up to eight Pump Modules can be controlled in this manner.

- 4 Connect the provided power cable to the AC power connector on the back of the Pump Module and into an appropriately grounded electrical receptacle.
- 5 If you are using a Weigh Shelf, Weigh Station, or Weigh Pad, connect its cable to the SHELF A port on the back of the Pump Module.

Routing the tubing

Before you begin

- Make sure you are familiar with the input and output ports for the type of reservoir or wash station.
- Ensure that you have the tubing kit (tubing, connectors, and quick-disconnect fittings) and source and waste bottles.

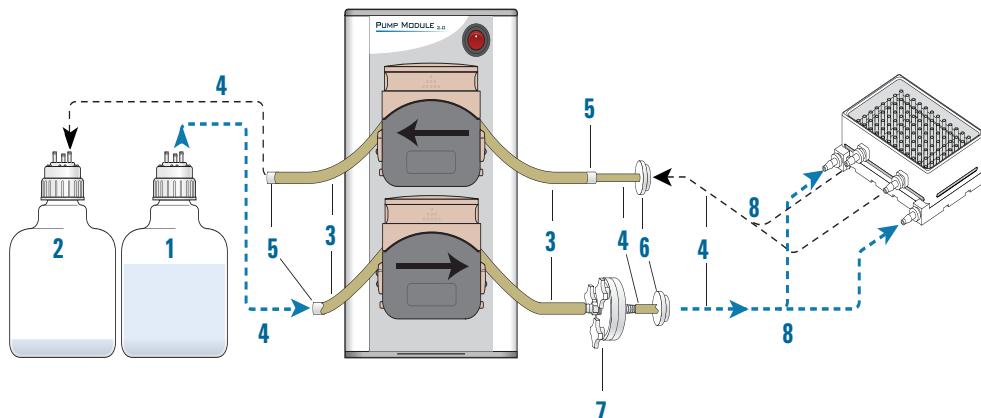
If you are using a Tip Wash Station (also known as a MicroWash Reservoir), make sure you have the inline pump filter.

The following figure shows a tubing configuration example for a single Pump Module and a Tip Wash Station. The table lists the components shown in the figure.

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Figure Example tubing configuration showing components



Item	Component	Description
1	Source bottle	Supplies the fill liquid for an autofilling reservoir, such as the Tip Wash Station
2	Waste bottle	Collects the waste liquid that is pumped from the reservoir
3	Tube B	The 8 mm (5/16 in) Marprene tubing Use tube B (larger diameter tubing) for the lengths of tubing in the pump heads and for the gravity drain on an Auto Filling Reservoir.
4	Tube A	The 6.4 mm (4/16 in) Marprene tubing Use tube A (smaller diameter tubing) for the input and output tubing connections to the reservoir and the source and waste bottles.
5	Connector, union	Joins tube A to tube B Over time, the tubing in the pump heads deteriorates and requires replacement. By placing a union connector on either side of the pump head, you can minimize the length of tubing that needs to be replaced.
6	Quick-disconnect fitting	Enables easy removal of an autofilling reservoir, such as the Tip Wash Station The quick-disconnect fittings include an automatic-close valve. Fluid can flow only if a positive connection is made.
7	Inline pump filter	Removes the particulates that can clog the chimneys in the Tip Wash Station As the pump operates, the inside of the tubing sheds particulates that must be filtered downstream to prevent the chimneys from clogging.
8	3-way connector	Enables one tube to branch into two tubes at the input and output ports on an autofilling reservoir, such as the Tip Wash Station



WARNING Ensure that the Pump Module and the liquid-handling device are turned off before routing the tubing.

Workflow for routing the tubing

Perform the following procedures in the order given:

Step	For this task...	See...
1	Connect tube A (smaller diameter tubing) to the reservoir ports.	"To connect tube A to a reservoir:" on page 15
2	Position tube B (larger diameter tubing) in the pump heads.	"To position tube B in the pump heads:" on page 16
3	Connect tube B from the pump heads to tube A from the reservoir.	"To connect Pump Module tube B to the tubing from the reservoir:" on page 18
4	Connect tube B from the pump heads to tube A from source and waste bottles.	"To connect the source and waste bottles to tube B:" on page 19
5	<i>Auto Filling Reservoir only.</i> Connect a length of tube B from the overflow gravity-drain to a waste bottle.	"(Auto Filling Reservoir only) To route the overflow gravity-drain tubing:" on page 19
6	Complete the Pump Module setup.	"To complete the Pump Module setup:" on page 19

To connect tube A to a reservoir:

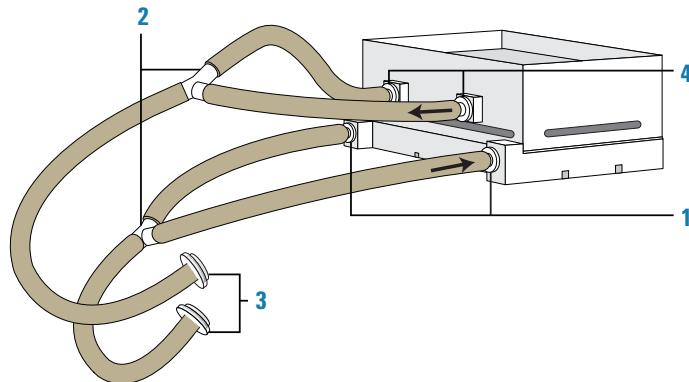
- 1 Place the reservoir on the platepad for the liquid-handling device.
Vertical Pipetting Station only. Place the reservoir on the shelf, and then skip to [step 3](#).
- 2 Using the following figure as a guide, route the tubing as follows for a reservoir with two input ports and two output ports:
 - a *Fill (input).* Cut three lengths of tube A. Two lengths of tubing are for the measured distance from the reservoir ports (1) to a 3-way connector (2). The third length of tubing is for the distance between the 3-way connector and either a quick-disconnect fitting (3) or tubing connector (not shown). Connect the tubing.
 - b *Empty (output).* Cut three lengths of tube A. Two lengths of tubing are for the measured distance from the reservoir output ports (4) to a 3-way connector (2). The third length of tubing is for the distance between the 3-way connector and either a quick disconnect fitting or tubing connector. Connect the tubing.

Note: If the reservoir has one output port, cut one length of tube A for the output tubing.

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Connecting the Pump Module

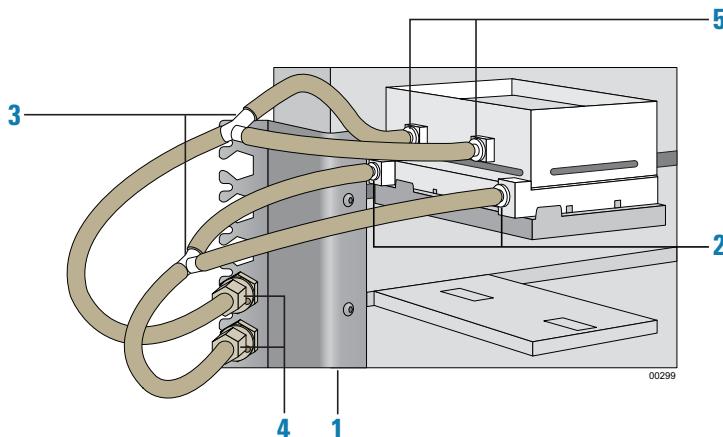
Figure Example tubing configuration for a Tip Wash Station: (1) input ports, (2) 3-way connectors, (3) quick-disconnect fittings, and (4) output ports



Note: The liquid enters the Tip Wash Station through the two lower input ports and flows up through the chimneys. The overflow of the chimneys flows out through the two upper output ports.

- 3 *Vertical Pipetting Station only.* Using the following figure as a guide, route the tubing from the reservoir to the Tubing Rack (1) as follows:

Figure Example tubing configuration for Vertical Pipetting Station with Tip Wash Station



- a *Fill (input).* Cut three lengths of tube A: two for the measured distance from the reservoir input ports (2) to the 3-way connector (3), and a third for the distance between the 3-way connector and a quick-disconnect fitting (4) on the Tubing Rack. Connect the tubing as the figure shows.
- b *Empty (output).* If the reservoir has two output ports (5), cut three lengths of tube A following the procedure in step a, and connect the tubing using a 3-way connector (3) as the figure shows. If the reservoir has one output port, cut one length of tube A.

To position tube B in the pump heads:



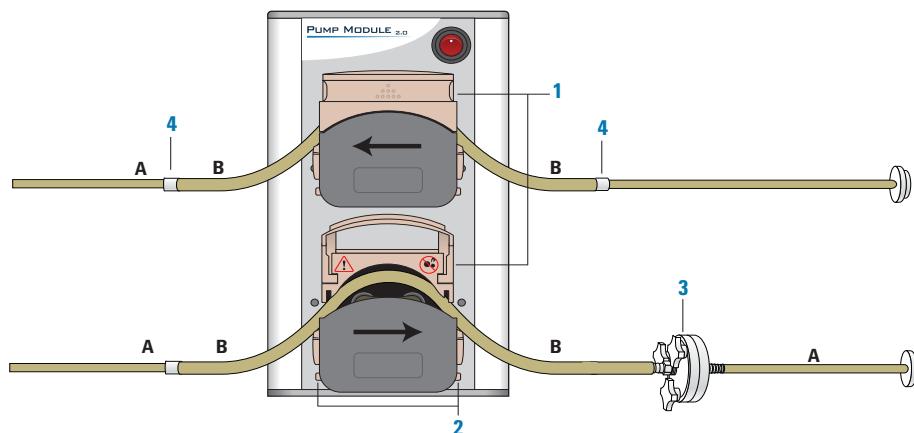
WARNING Pinch hazard! Keep your fingers clear of the pump head interior when you close the pump head cover. Keep the pump head cover closed while the pump is running.

CAUTION Ensure that the tubing is not kinked, twisted, or stretched against the rollers. Make sure that the tube is not crushed in the clamps.

- 1 Determine which of the two pump heads (1) will control the input flow (fill direction) to the reservoir and which will control the output flow (empty direction) to the waste bottle.

Each pump head can be configured in the software to flow in either direction. In the following figure, the lower pump head controls the input flow to the reservoir, and the upper pump head controls the output flow.

Figure Inserting tubing into the pump heads



- 2 For each pump head, cut a length of tube B that is long enough so that the tubing can gently arch over the rollers in the pump head and still have plenty of slack on either side of the pump head for a connection to tube A.
- 3 To insert tube B into a pump head:
 - a Lift up the flip-top cover on the pump head so that it is fully open.
 - b On each side of the pump head, turn the dial (2) to open the clamps (V-grooves) fully to accommodate the diameter of tube B.
 - c Insert a portion of tube B so that the tubing gently arches over the rollers. Ensure the tubing is located in the center of the tube clamps (V-grooves) on either side of the pump head, and then carefully lower the cover.

Repeat this step for the other pump head.

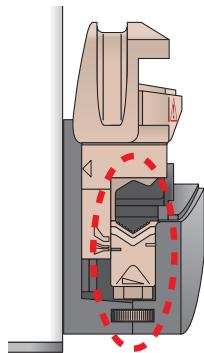
CAUTION Ensure that the pump head clamps are set properly for the diameter of the tubing. Incorrectly adjusted clamps can constrict the flow or damage the tubing when the pump head is closed.

Note: If any creeping of the tubing occurs during operation, tighten the clamps slightly using the clamp dials (2).

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Figure Open pump head (side view) showing fully open clamp and clamp dial



- 4 *Tip Wash Station only.* For the input flow (fill direction) into the Tip Wash Station, connect the pump filter (3) to tube B between the Pump Module and the Tip Wash Station as the figure shows.

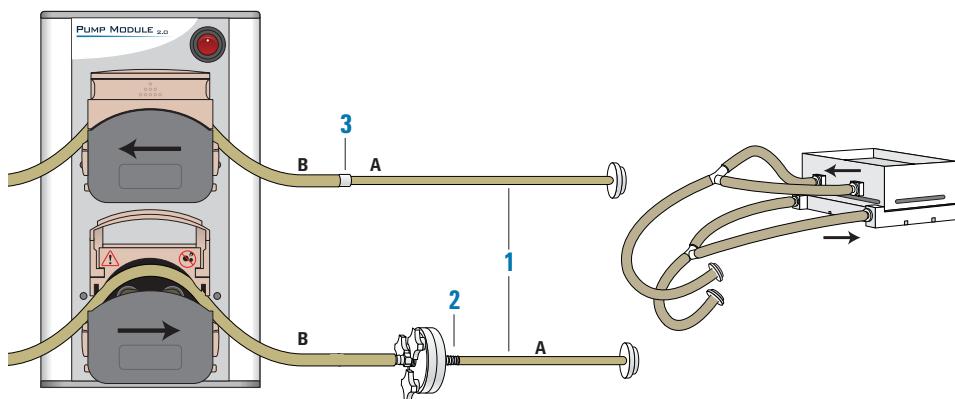
Ensure that the filter is oriented so that the three thumbscrews face toward the Pump Module and the other side of the filter faces toward the Tip Wash Station.

- 5 Insert a tubing connector (4) on each open end of tube B, as the figure shows.

To connect Pump Module tube B to the tubing from the reservoir:

- 1 Cut two lengths of tube A measured for the distance between the end of tube B and the connector on the end of tube A from the reservoir. See the following figure, item 1.

Figure Tubing from Pump Module to reservoir



- 2 For the fill direction:

- a Connect one length of tube A to the tube B connector or to the inline filter (2), if applicable, on the input tubing (fill direction) from the Pump Module.
- b Connect the other end of tube A to the quick-disconnect fitting on the end of tube A that is connected to the reservoir input ports.

- 3 For the empty direction:

- a Connect the other length of tube A to the tube B connector (3) on the empty-direction tubing going into the Pump Module.

- b** Connect the other end of tube A to the quick-disconnect fitting on the end of tube A that is connected to the reservoir output ports.

To connect the source and waste bottles to tube B:

- 1 Cut a length of tube A measured for the distance from the source bottle to the Pump Module. Allow plenty of slack in the tubing.
- 2 Attach a quick-disconnect fitting to one end of tube A, and insert the quick-disconnect fitting into the output port of the source bottle.
- 3 Connect the other end of tube A to the tube B connector on the input line.
- 4 Repeat steps 1 to 3 for the waste bottle, ensuring that you connect tube A from the waste bottle to the tube B connector on the output line at the Pump Module.

(Auto Filling Reservoir only) To route the overflow gravity-drain tubing:

- 1 Cut tube B to the measured length from the reservoir drain port to a waste bottle.
Vertical Pipetting Station only. Cut a length of tube B for the distance from the reservoir drain port to the Tubing Rack, and from the Tubing Rack to the waste bottle. Attach the tubing using the quick-disconnect fittings.
- 2 Attach a quick-disconnect fitting to one end of the tubing, and insert the fitting into one of the ports on the waste bottle. Make sure the waste bottle is vented.
- 3 Attach the other end of the tubing to the reservoir drain port connection.

CAUTION Do not connect the overflow line to the empty line, or else the overflow will not drain properly. To enable the gravity drain system to work effectively, the drain tubing must always travel downward.

To complete the Pump Module setup:

- 1 *Vertical Pipetting Station only.* Slide the reservoir shelf back and forth to ensure the shelf has enough tubing for unrestricted travel.
- 2 Turn on the Pump Module, and then turn on the liquid-handling device.
- 3 Start the automation software, and then configure the autofilling accessory parameters.

IMPORTANT When using Marprene tubing, reset the tension after you run the Pump Module for the first 30 minutes. To reset the tension on the tubing, open the flip-top cover of the pump head, allow the tube to settle naturally across the rollers, and then reclamp the tube.

IMPORTANT When the Pump Module is not in use, lift the flip-top cover on each pump head to prevent flattening the tubing and to help maximize the tubing life.

Removing a Pump Module

To remove the Pump Module:

- 1 Using the automation control software, run the Pump Module and drain the reservoir until empty.
- 2 Turn off the Pump Module, and then turn off the liquid-handling device.

- 3** Disconnect the Pump Module power and communication cables. Unplug the Weigh Station cable from the Pump Module.
- 4** Disconnect the tubing from the reservoir.
- 5** Remove the reservoir.
- 6** Remove the tubing from the Pump Module and from the source and waste bottles.

Related information

For information about...	See...
Autofilling reservoirs	"Autofilling reservoir options" on page 9
Configure the Pump Module, reservoir, and associated resources	User documentation for the automation software at www.agilent.com/lifesciences/automation
Routine maintenance	"Maintenance and troubleshooting" on page 22

Installing a Weigh Station

About this topic

This topic describes the Weigh Station and how to install and remove it from the physical workspace.

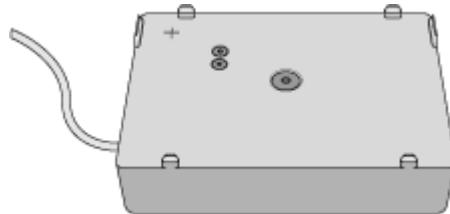
For details on connecting the cable, see "Connecting the Pump Module" on page 12.

About the Weigh Station

A Weigh Station measures the weight of a Agilent autofilling reservoir that is placed on it. When appropriately configured in the software, the Weigh Station works with the Pump Module to ensure that the reservoir is filled to a constant liquid level during the pump reagent task in a protocol. By monitoring the weight of the reservoir that sits on it, the Weigh Station controls when the Pump Module is activated.

Use one Pump Module for each pairing of reservoir and Weigh Station.

Figure Weigh Station



Installing the Weigh Station

Before you begin

Determine where to install the Weigh Station. The Weigh Station must be close enough to the Pump Module, so that the Weigh Station cable can be connected to the Pump Module SHELF A port.

Make sure you have the following:

- Sockethead screw (supplied with the Weigh Station)
- M4 hex wrench
- M5 hex wrench



WARNING Turn off the Pump Module and the liquid-handling device or system before you install or remove an accessory within the physical workspace.

To install a Weigh Station:

- 1 If you are replacing a platepad with a Weigh Station, remove the screw in the center of the platepad, and then remove the platepad.
- 2 Place the Weigh Station at the installation location.
Make sure the side with the cable faces towards the Pump Module and that the Weigh Station sits level.
- 3 Insert the supplied sockethead screw into the center of the Weigh Station and use the M5 hex wrench to tighten the screw.

Removing the Weigh Station

To remove a Weigh Station:

- 1 Disconnect the Weigh Station from the Pump Module.
- 2 Using the M5 hex wrench, remove the screw in the center of the Weigh Station.
- 3 Remove the Weigh Station.

Related information

For information about...	See...
Verifying the teachpoint accuracy of the Weigh Station	User documentation for the liquid-handling device at www.agilent.com/lifesciences/automation

For information about...	See...
Calibrating the Weigh Station	User documentation for the automation software at www.agilent.com/lifesciences/automation
Installing a Weigh Shelf	<i>Vertical Pipetting Station User Guide</i>
Connecting the cables and tubing	"Connecting the Pump Module" on page 12

Maintenance and troubleshooting

About this topic

This topic includes the following:

- Periodic maintenance and inspection
- Pump head tube size adjustment
- Reporting problems

Periodic maintenance and inspection

Periodically, perform the routine maintenance listed below. Your schedule might vary depending on the frequency of Pump Module use.

Maintenance task	Schedule	Symptoms
Clean the Pump Module using standard laboratory wipes and a mild detergent or ethanol on the painted white surfaces and the aluminum surfaces. Clean up any spills immediately.	Weekly or as needed	Dust, grime, or chemical deposits on exterior
Inspect the Pump Module tubing for wear and leaks. Replace the tubing as necessary.	Monthly	Tube deterioration, or liquid fails to pump or fails to drain properly
Calibrate the Weigh Station, if applicable.	Bimonthly	Deterioration of liquid-level accuracy in reservoir

IMPORTANT When the Pump Module is not in use, lift the flip-top cover on each pump head to prevent flattening the tubing and to help maximize the tubing life.



WARNING Ensure that the Pump Module is turned off before you clean the device.

CAUTION Do not use any abrasives, corrosive cleaning agents, or metal brushes to clean the Pump Module.

Troubleshooting

Locate your problem in the following table and try the solution. If the problem persists after you try the solutions, contact Automation Solutions Technical Support.

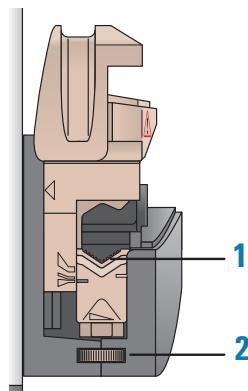
Problem	Potential cause	Solution
Tubing creeps through the pump head instead of being secured in place.	The pump head clamp is too loose for the tube size.	Adjust the tubing clamp for the tube size. See Pump head tube size adjustment .
The tubing is crushed or damaged in the pump head.	The pump head clamp is too tight for the tube size.	Adjust the tubing clamp for the tube size. See Pump head tube size adjustment .
The liquid flow is constricted or liquid fails to pump or drain properly.	The tubing is deteriorated or the pump head clamp is too tight for the tube size.	Inspect the tubing for wear and leaks. Replace the tubing as necessary. If necessary adjust the pump head clamp, see Pump head tube size adjustment .
The liquid-level is no longer accurate for a reservoir on a Weigh Station.	The Weigh Station requires recalibration.	Calibrate the Weigh Station. For details, see the user documentation for your automation software.

IMPORTANT When the Pump Module is not in use, lift the flip-top cover on each pump head to prevent flattening the tubing and to help maximize the tubing life.

Pump head tube size adjustment

The pump head clamps can be adjusted to accommodate different tubing sizes. A properly adjusted clamp opening secures the tubing in the pump head while allowing an efficient flow of liquids. The preceding troubleshooting table describes the potential problems that can result from incorrectly adjusted clamps.

Figure Open pump head (side view) showing (1) open clamp and (2) clamp dial



To change the tube clamp adjustment:

- 1 Lift the flip-top cover on the pump head so that it is open fully.
- 2 On each side of the pump head, turn the dial to open the clamp fully.
- 3 Ensure that the tubing gently arches over the rollers and is located in the center of the track (V-groove) on each side of the pump head.
- 4 Set the tube clamps to the correct size, making sure to align the scale on both sides of the pump head.
- 5 Carefully lower the cover to clamp the tube in place.

When the pump head top closes on the tubing, the tubing is clamped and stretched to locate it in the correct position and with the correct tension. The correct tension is essential for good tube life.

IMPORTANT A new Marprene tube in the pump head requires re-tensioning after the first 30 minutes of running. To re-tension the tubing, open the flip-top cover of the pump head, allow the tube to settle naturally across the rollers, and then reclamp the tube.

Reporting problems

If you are unable to resolve a problem, contact Automation Solutions Technical Support. For contact details, see the [Notices](#) section of the title page.

Make sure you have the serial number of the device when contacting Automation Solutions Technical Support. You can find the serial number on the device serial number label.

Related information

For information about...	See...
Power and environmental requirements	“Laboratory setup requirements” on page 5
Safety guidelines	“Safety and regulatory compliance” on page 2



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User Guide

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